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Original Research Article

Study of clinical features, management and prognostic factors in peritonitis in adults at BTGH, Gulbarga

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Abstract: Peritonitis continues to be one of the major challenging problems for practicing surgeons. Despite the many advances in antibiotics and supportive care, the mortality rate of patients with peritonitis remains unacceptably high. Its mode of treatment varies from the one requiring immediate surgical intervention to that requiring conservative management. Accuracy in diagnosis and management is a challenge to every surgeon. Our study was aimed to study the different clinical features, management and prognostic factors like age, sex, etiology of peritonitis and site of perforation, time of presentation to hospital etc and application of scoring systems like to peritonitis .Mannheim peritonitis index, Sepsis score of Elebute and Stoner, which help the surgeon to assess accurately, at what stage of disease process the patient was and to facilitate treatment modalities as well as for comparison purpose. The result of various studies on peritonitis and especially of mortality varies from 10-40%. These variations are largely due to variation in sample study. While some centers mainly received early uncomplicated cases others received patients in their later stages. Obviously results varied. The Conclusion Our prospective study concludes extremes of age have adverse effect on the outcome. Impact of sex on outcome conclusively proved that female sex has poor outcome. Diffuse peritonitis with fecal contamination goes worse. Diabetes mellitus and cardiovascular problems increased the morbidity. Mannheim peritonitis index and sepsis score of Elebute Stoner HIGHER SCORE (MPI>26, SEP SCORE >20) more morbidity and mortality. if lowest scores like (MPI<26,SEP SCORE >20) had better outcome. Delayed presentation has effect on both mortality and morbidity is beyond our control. Only adequate Health education, proper referral mechanism can help in reducing this. Peritonitis and its sequelae management involve lots of skill, expensive modalities of monitoring and treatment which has to be utilized judiciously based on risk stratification.

Keywords: Peritonitis, Diabetes mellitus, perforation

INTRODUCTION

Peritonitis is defined as an inflammation of the serosal membrane that lines the abdominal cavity and the organs. The peritoneum, which is an otherwise sterile environment, reacts to various pathologic stimuli with a fairly uniform inflammatory response. Depending on the underlying pathology, the resultant peritonitis may be infectious or sterile (i.e., chemical or mechanical). Intra-abdominal sepsis is an inflammation of the peritoneum caused by pathogenic microorganisms and their products [1]. With the advances that are being made in many areas of medicine, the surgeon must have knowledge about infectious diseases of the peritoneal cavity which has increased in severity and complexity. In addition to the surgical management of secondary peritonitis from gastro intestinal perforation, the practicing duty surgeon may be called in to manage patient with additional complications. Apart from these, there is rise in number of patients with persistent intra-abdominal sepsis or tertiary peritonitis in whom infection is associated with multiple system organ failure. Peritonitis continues to be one of the major challenging problems practicing surgeons. Despite the many advances in antibiotics and supportive care, the mortality rate of patents with peritonitis remains unacceptably high. Its mode of treatment varies from the one requiring immediate surgical intervention to that requiring conservative management. Accuracy in diagnosis and management is a challenge to every surgeon. Now a day the surgical infections become so complex that it is very difficult to treat with common broad spectrum antibiotics. The complex nature of surgical infections, the multidimensional aspects of treatment, and the increasing complexity of ICU support make evaluation of new diagnostic and therapeutic advances in this field very difficult. Scoring systems that provide objective descriptions of the patient's conditions at specific points in the disease process aid our understanding of these problems. This is important in determining the course;

the disease is taking in a particular patient, whether the line of management taken is appropriate or need to be changed. The management of peritonitis patients is going better with the understanding of patho-physiologic basis of the disease, the concept of sepsis syndrome and multiorgan failure. The current trend is towards recognising these at the earliest and institute aggressive therapy, mainly surgical methods. When the patient has already gone into multi-organ failure, the outlook appears dismal whatever the line of management is. But the proper clinical monitoring with optimum number of investigations remain the corner stone of emergency surgery and also for the better use of above methods.

MATERIALS AND METHODS

This prospective study was conducted in BASAVESWAR TEACHING AND GENERAL HOSPITAL over a period of 3 years from Nov 2013 to Sep 2015, in 100 patients with peritonitis, admitted through Department Surgery were included in this study.

METHODOLOGY

The symptoms included abdominal pain, distension, vomiting and, dehydration and shock, duration of onset of symptoms and time of admission in to hospital. Based on history and physical examination, a provisional diagnosis of peritonitis was made which was confirmed by investigations including X-ray chest for pneumoperitoneum and abdominal X-ray for air fluid levels, USG for free fluid in the abdomen and peristalisis. All patients were resuscitated after passage of IV Cannulas, Nasogastric tube and Foley's catheter. All patients received IV fluids and antibiotics. With the confirmation of the initial diagnosis of peritonitis due to different aetiologies corresponding to surgical causes, emergency laparotomy was performed in all indicated patients & treated depending upon the operative findings. Peritoneal fluid was sent for culture and sensitivity following the procedure. The peritoneal cavity was irrigated with warm normal saline and drains were left in abdomen and wound was closed either as mass closure or in layers. Patients were monitored post-operatively for recovery and early detection and management of complications.

Parameters measured

Risk satisfaction of above selected patients as below:

1. Clinical judgments - Diagnosed using clinical ,X-RAY,USG CT SCAN techniques and operative finding (if any) as confirmatory evidence
2. Disease aetiology -Type of peritonitis based on aetiology
3. Severity index from˙ Mannheim peritonitis index (MPI), Sepsis score of Elebute and Stoner & evidence of shock
4. Age ,Cancer, Diabetes Mellitus, Cardiac disease history

Inclusion Exclusion Criteria

All adult patients with peritonitis due to different etiologies were included in the study.

Exclusion Criteria

Patients with gynecological causes of peritonitis, Spontaneous bacterial peritonitis were excluded from the study.

RESULTS

All patients diagnosed as peritonitis and admitted to Basaveshwar Teaching and General Hospital, Gulbarga Surgical Ward between the periods July 2013 to September 2015. Total number cases studied were 100.

A. Study of Clinical Features, Investigations and Management in Peritonitis

Different clinical features and para clinical measurements were studied in 100 patients and tabulated below. The different symptoms include pain, distention, vomiting, constipation, diarrhea and signs include general condition, tachycardia, hypotension, dehydration, **diabetes** mellitus and hypertension, tuberculosis, HIV, CHD.

Table-1: Symptoms

SYMPTOMS	No of pts
ABDOMINAL PAIN	100%
ABDOMINAL DISTENSION	68%
VOMITING	42%
CONSTIPATION	23%
DIARRHOEA	10%
FEVER	38%

Table-2: Signs

SIGNS	No of pts
TENDERNESS	100%
GUARDING & RIGIDITY	88 %
FAIR GEN .CONDITION	65%
TACHYCARDIA	54%
HYPOTENSION	42%
DEHYDRATION	79%
DIABETES	36%
HTN	20%
TUBERCULOSIS	6%
HIV	1%

PARA CLINICAL PARAMETERS

Among all 100 patients admitted the laboratory investigations were as follows .there were patients with hemoglobin <13gm/dl for about 42 patients(42%),and Leucocytosis >11,000were 56 (56%), albumin <3gm/dl were about 41(41%), urea > 35 was 52% , creatinine >1.2mg/dl 36% and bilirubin >2mg/dl were about 5%.

Table-3: Para clinical parameters

Parameter	TOTAL NO Pts
Hb(<13gm/dl)	42%
Leucocytosis(>11,000/mm^3)	56%
ESR (> 20/hr)	23%
ALBUMIN(<3gm/dl)	41%
UREA(>35mg/dl)	52%
CREATININE(>1.2mg/dl)	36%
BILIRUBIN(>2mg/dl)	5%

Investigations like chest x ray and abdomen, USG abdomen, CT scan were performed shows the following information .X-ray chest shows U/L Pleural effusion in 24%,Pneumonia in 3%,old healed Koch's lesion in 7%,and Emphysema in 19% ,Bronchitis for about 32%.among all these most common chest x ray finding was bronchitis for about 32% of cases.

Table-4: Investigations X-ray findings

INVESTIGATION	DIAGNOSIS
Chest X-ray PA view	PLEURAL EFFUSION -24%,(MOSTLY U/L) PNEUMONIA -3%, OLD HEALED KOCH -7%, EMPHYSEAMA-19%, BRONCHITIS -32%
Erect X-ray abdomen	AIR UNDER DIAPHRAGM -58% AIR FLUID LEVELS -4%

The ultrasound abdomen shows gas shadow in 34 % ,and free fluid in 67% and decreased peristalisis in 72% thickened omentum with tubercles in 4% ,loculated ascites in 2%,thickened bowel in 3%,pelvic pus collection in 7% of patients. Among all these free fluid is most common finding of USG in 87% of patients.

Table-5: Investigations USG & CT scan findings

INVESTIGATION	DIAGNOSIS
USG ABDOMEN	GAS SHADOW--- 34% FREE FLUID ---87%, ↓ PERISTALISIS --72% THICKENED OMENTUM WITH TUBERCLES-- 4% LOCUATED ASCITES -- 2% Thickened bowel-- 3% Pelvic pus collection 7%
USG guided Paracentesis especially in post - traumatic peritonitis	It shows 3% shows bile as collection in abdominal cavity ,and 3% cases showed bloody tap,2% cases showed turbid/cloudy fluid tap.
CT SCAN Not performed in all cases, only in selected cases CT scan was done. In 72 cases with patient compliance.	FREE FLUID AND GAS –67% THICKENED BOWEL WALL --7%(FEW CASES MISSED BY USG) GANGRENOUS BOWEL--3 % OBSTRUCTION--3% COLONIC MASS-- 6%

AMOUNT OF PERITONEAL COLLECTION OBSERVED INTRA OPERATIVELY

The total no of cases with peritoneal collection were 98 among 100.among all most cases about 31(31%) with minimal collection, 11(11%) with >1000ml. most common amount of collection ranges from 500-1000ml in 29% of cases.

Table-6: Amount of peritoneal fluid collection

Amount of collection	Total No.of cases
<250ml	31%
250-500ml	27%
500-1000ml	29%
>1000ml	11%

TYPE OF PERITONEAL COLLECTIONS (TOTAL CASES 98 OUT OF 100)

Among all patients posted for surgery 36% of patients have cloudy exudative collection and 23% with early presentation within 24 hours nil by mouth since the onset of abdominal pain,10% patients presented with feculent exudates intra operatively.

Table-7: Type of peritoneal collection

Type of collection	No of patients
Clear	23%
Cloudy	36%
Bilious	19%
Pus	12%
Feculent	10%

PERITONEAL FLUID CULTURE & SENSITIVITY

The culture and sensitivity studies in the management of peritonitis may be in better outcome of most of the patients. Even the growth was mixed organisms, but the organism most commonly isolated, and predominant one was E.coli and Bacteroides which were sensitive to Cefoperazone & Sulbactam. Among all E.coli and other growths most of them sensitive to Cefoperazone and Sulbactam except 10% of peritonitis patients, which were sensitive to Linezolid and Meropenam.

Table-7: Bacterium isolated, culture and sensitivity

Bacterium isolated	Sensitive for	Resistant for
E.coli	Cefoperazone+ Sulbactam, Piperacillin + Tazobactam	Cefotaxime, Ceftriaxone, Ofloxacin, Ciprofloxacin, Sulphonamides
Bacteroides	Metronidazole, Amikacin, Cefoperazone +Sulbactam, Piperacillin +Tazobactam Ofloxacin ,Ciprofloxacin	Cefuroxime, Ceftriaxone, Cefoperazone, Ceftriaxone
Klebsiella	Amikacin, Iimipenam, Meropenam	Cefoperazone+ Sulbactam, Cefotaxime, Cefixime, Ciprofloxacin, Sulphonamides, Ofloxacin
Staphylococcus aureus	Piperacillin+ Tazobactam, Meropenam, Linezolid	Cefuroxime, cefixime, cfazolin, Sulphonamides, Ofloxacin, Ciprofloxacin.
Mycobacterium tuberculosis	INH and RIFAMPICIN, RIFABUTIN, ETHAMBUTAL(among 4 tubercular cases only 3 cases sensitive to all drugs, except one case which was resistant to R,,S,E	RIFAMPICIN, PYRAZINAMIDE, ETHAMBUTAL, STREPTOMYCINE.

MANAGEMENT OF PERITONITIS BASED ON ETIOLOGY

Out of all 100 cases taken in to study, there were 44 cases of duodenal and gastric perforation were managed with exploratory laparotomy with omental patch (grahams patch) and about 18 of cases of ileal perforations were managed with exploratory laparotomy and simple closure of perforation after freshening the edges. Stricturoplasty was done in case of distal ileal stricture in 3 cases. End colostomy performed in 7cases. About 12 cases of perforated appendix were preceded for EL (exploratory laparotomy) with appendectomy. Hemicolectomy done in 2 % Of cases of descending colonic mass and transverse colonic mass diagnosed on biopsy as Adenocarcinoma of colon.

Table-8: Type of surgical procedure

Type of Procedure	% of Total no of pts
EL WITH CLOSURE OF PERFORATION WITH OMENTAL PATCH	44
EL AND SIMPLE CLOSURE OF PERFORATION	18
END COLOSTOMY	7
STRICTUROPLASTY	3
HEMICOLECTOMY	2
EL & RESECTION ANASTOMOSIS ILEUM	9
EL & RESECTION ANASTOMOSIS OF COLON	2
EL WITH APPENDECTOMY	12
EL & MECKELS DICERTICULECTOMY WITH RESECTION ANASTOMOSIS	3
TOTAL NO	**100**

Duration of Hospital Stay

Among all patients admitted those with hospital days <15 days were 23%, 15-25 days were 50,and 25-35 days were 19,>35 days were 8.the mean stay of hospital duration was 25.

Table-9: Duration of hospital stay

Days of Stay	(n=100)
<15 DAYS	23
15-25 DAYS	50
25DAYS-35DAYS	19
>35DAYS	8
TOTAL	**100**

Post operative complications

The complications were categorized in to general and local general complications. General Complications include Pulmonary 55%, Renal 30%, and Septicemia 24%, and Cardiac 3%, Thrombotic complications 1%. Local complications include Surgical Site Infection (SSI) in 35%, Entero cutaneous fistula (ECF) in 4 %, fecal fistula (FF) in 5%, Intra Abdominal Abscess (IAA) in 2%, Burst Abdomen (BA) in 4 % of cases. Among all the most common general and local complications were Pulmonary and SSI respectively.

B. Study of factors influencing prognosis

(i) Study of Patient factors

Age

The patients with age ranging from 17 years – 75 years were studied. Maximum number of patients were in Middle age (30-50 years)- 41 patients. But the mortality rate was more in extremes of age that is ≤ 20 years > 50 years group. The mortality rate of elderly patient was % 75% (3 patients died out of 4). Total no of patients from 17 to 29 years are 19 patients and from 30-49 years are 36 patients. Total no of patients from 50-69 years are 37 and among them 15 patients were died, and above 70 years are 8 and 5 were died among 8.

Table-10: Study of age Vs mortality

Age	Survived	Died	Total
<20	zero	zero	zero
20-29	17	1	18
30-39	13	5	18
40-49	14	5	19
50-59	13	8	21
60-69	9	7	16
>70	3	5	8
Total	**69**	**31**	**100**

Sex

Maximum number of patients were male -78, but mortality rate was more in females(38%). Since maximum patients were males, the number of patient died were

Maximum in males and in my study the total no of females admitted are 22 and 12 females were expired .

Table-11: Study of Sex Vs mortality

	SURVIVED	DIED	TOTAL
MALE	59 85% 75%	19 62% 24%	78 (78% males)
FEMALE	10 15% 45%	12 38% 54 %	22 (22% females)
TOTAL	69 (100%)	31 (100%)	100

Mortality v/s time of presentation

The time of presentation of patients ranged from <24 hours to up to 12 days. Maximum patients presented in 1-3 days (39%). Mortality increased correspondingly with delay in perforation. In our study the mortality for < 24 hours was 24% may be because of associated sepsis at the time of admission in surgery ward and was operated for ileal perforations with fecal peritonitis. It was 24% for <24 hours, 72% for 7-10 days. No cases recorded with history of abdominal pain more than 10 days.

Table-12: Study of time of presentation Vs mortality

Duration	Survived	Died	Total
< 24 hours	23(76%) 33%	7(24%) 24%	30 (30%)
1 day-3days	31(79%) (45%)	8(21%) 26%	39 (39%)
4 days-6days	14(58%) (20%)	10(42%) (33%)	24 (24%)
>7days	2(28%) (2%)	5(72%) (17%)	7 (7%)
TOTAL	69(100%)	31 (100%)	100 100%

Mortality Vs site of pathology

In my study of peritonitis due to perforations were grouped into 6 sites. ileal perforation was the commonest site may be due to different etiologies in ileal perforation (34%) followed by Duodenal (30%) due to peptic ulcer disease, Gastric 14%, Appendicular (12%) and Jejunal(3%). The mortality rate of Duodenal perforation is 16%, Ileal 38% which include many aetilogies like Trauma, Meckels Diverticulum, Typhoid, Tuberculosis. etc, while Gastric perforation was 28%.

Table-13: Study of site of pathology Vs mortality

Etiology	Survived	Died	Total
Duodenal	25	5(16%)	30
Ileal	21	13(38%)	34
Gastric perforation	10	4 (28%)	14
Appendicular	9	3 (25%)	12
Jejunal (d/t trauma)	2	13(3%)	3
Colon	2	5(71%)	7
Total	**69(100%)**	**31(100%)**	**100(100%)**

Mortality vs Etiology of Peritonitis

The most common etiology in this study was found to be acid peptic disease(44%) causing Perforative peritonitis among this duodenal perforation is most common,. next to duodenal typhoid is second common etiology constitutes 18% of cases, appendicular 12%, trauma 8%.

The mortality is more in typhoid 39% etiology and the mortality d/t typhoid increases in late presentation and with number of perforations in ileum.

Table-14: Study of etiology of peritonitis Vs mortality

Aetiology	Survived	Died	Total
Typhoid /enteric fever	11(61 %)	7(39%)	18
Acid peptic disease(G+D)	31(70 %)	11(25%)	44
Appendicular	10(83 %)	2 (16%)	12
Tuberculosis	2(50 %)	2(50%)	4
Meckels diverticulum	2(66 %)	1(33%)	3
Colonic diverticulosis	1(50 %)	1(50 %)	2
Trauma	6(75 %)	2(25%)	8
Malignancy	2(66 %)	1(33%)	3
Intestinal obstruction (intss/volv)	2(66 %)	1(33%)	3
Mesenteric ischemia gangrene bowel	2(66 %)	1(33%)	3
TOTAL	69	31	100

Effect of shock on mortality

As many as 54 patients (54%) presented with shock on day 1. They had high mortality of 26 (48%) in comparison to 5 (9%) in patients without shock.

Table-15: Study of shock Vs mortality

Shock	Survived	Died	Total
Shock on day 1	28(52%)	26(48%)	54 (54%)
No shock on day 1	41(91%)	5(9%)	46 (46%)
Total	**69**	**31**	**100**

EVALUATION OF SCORING SYSTEMS

Results of MPI (Mannheim Peritonitis Index Vs mortality)

The minimum score of presentation was 10 while maximum was 47. Maximum patients about 60 patients were in the rage 20-29. The mortality increased exponentially for score more than 26. While the range of 10-19 had 4% mortality, the range 20-29 had 21(35%) mortality. It was 79% for score 30-39 and no case with score of above 40. To analyse mortality rate more critically, an arbitrary cut off point of MPI score 26 was taken. 66 patients were in score <26 while 34 had more than 26. The mortality rate was as low as 7(10%) with score <26 while it was as high as 24(71%) in patients with score of more than 26.

Table-16: Study of MPI Vs mortality

MPI	Survived	Expired	Total
0-9	0	0	0
10-19	20 (96%)	1(4%)	21
20-29	39(65%)	21(35%)	60
30-39	10(53%)	9 (47%)	19
40-49	0	0	0
	69	31	100

Table-17: Study of MPI Vs mortality

MPI	Survived	Expired	Total
≤26	59(89%)	7(11%)	66
>26	10 (29%)	24(71%)	34
TOTAL	69	31	100

SEPSIS SCORE OF ELEBUTE AND STONER

Results of sepsis score of Elebute and Stoner

The minimum score was 7 while most was 37. The maximum number of patients was in 10-19 and 20-29 score range, that is 41 (41%) and 30 (30%) respectively. The mortality in 0-9 was 0% and 10-19 was 2 (5%), where as it was 19(64%) and 10(100%) in 20-29 and 30-39 range respectively. Similar to MPI, an arbitrary point of 20 was chosen as cut off point (Elebute *et al.;*).60 patients had score of ≤20 while 40 had score of ≥20. The mortality rate in ≤20 was 2(4%) while score ≥20; it was 29 (72%).

Table-18: Study of Sepsis score Vs mortality

SCORE	SURVIVED	DIED	TOTAL
0-9	19(100 %)	0	19(19%)
10-19	39(95%)	2(5 %)	41(41%)
20-29	11(36 %)	19(64 %)	30(30%)
30-39	0	10(100 %)	10(10%)
TOTAL	69	31	100(100%)

Table-19: Study of Sepsis score Vs mortality

SCORE	SURVIVED	DIED	TOTAL
≤20	58(96 %)	2(4 %)	60(60%)
>20	11(28%)	29(72%)	40(40%)
	69	31	100

Duration of Hospital Stay Vs Mortality

Among all patients admitted those with hospital days <15 days outcome was good and patients with >35 days poor outcome. 25 days is mean length of hospital stay .the mortality in patients more than 35 days is 62%.

Table-20: Study of Hospital stays Vs mortality

DAYS OF STAY	SURVIVED	DIED	(N=)FREQUENCY
<15 DAYS	16(70%)	7(30%)	23
15-25 DAYS	41(82%)	9(18%)	50
25DAYS-35DAYS	9(47%)	10(47%)	19
>35DAYS	3(36%)	5(62%)	8
TOTAL	69	31	100

Post operative complications

Each complication correlated with the Age, MPI, SEPSIS SCORE and Duration of perforation.

General complications like pulmonary, cardiac, renal, septicaemia, thrombosis due to prolonged bed stay were studied in correlation with Age, MPI,SEPSIS SCORE, Duration of perforation .It Was pulmonary complications most common constitute about 55%, cardiac 3%, renal 30%, septicaemia 24% etc.

Type of complications	Age <50y N=55	Age >50y N=45	MP1< 26 N=66	MPI >26 N=34	SEPSIS SCORE <20 N=60	SEPSIS SCORE >20 N=40	PERFORATION <24 HOURS N=30	PERFORATION >24HOURS N=70
General Complications								
Pulm N=55	30	35	26	30	18	36	14	41
Cardiac N=3	2	1	0	3	0	3	0	3
Renal N=30	18	12	8	22	10	20	10	20
Thrombotic N=1	1	0	0	1	0	1	0	1
Toxemia N=24	7	17	8	16	6	18	5	15

Local Complications Like Surgical Site Infection, ECF/FF, pelvic abscess, IAA, burst abdomen were studied It was as SSI 35%,4%ECF,5%FF,4%BA,2% IAA.

Type of complications	Age <50y N=55	Age >50y N=45	MPI <26 N =66	MPI >26 N=34	SEPSIS SCORE <20 N=60	SEPSIS SCORE >20 N =40	PERFORATION <24 HOURS N=30	PERFORATION >24HOURS N=70
Local complications								
SSI N=35	15	20	20	15	5	30	6	29
ECF/FF N=9	4	5	5	4	4	5	2	7
Pelvic abscess (N=3)	1	2	1	2	0	3	1	2
(N=4) Burst abdomen	0	4	1	3	1	3	1	3
IAA (N=2)	1	1	0	2	0	2	1	1

STUDY OF FACTORS CONTRIBUTING TO MORBIDITY

Morbidity was defined as patients who developed any complication which required specific treatment and/or whose hospital exceeded 20 days. Four important factors, which had bearing on mortality were undertaken to study whether they had any effect on morbidity they were.

1. Age≤ 50 years, > 50 yrs.
2. MPI ≤26, > 26.
3. Sepsis score ≤20, > 20.
4. Perforation duration ≤24 hrs, > 24 hrs.
5. General and local complications were studied pulmonary was the commonest general complication is pulmonary about 55 % in patients followed by Renal and Toxemia. Wound sepsis was the common local complication 35% patients.

Mannheim peritonitis Index (MPI) and sepsis score

As in age group general complication in survivor group (MPI ≤ 26, sepsis ≤20) was) was considerable less than in mortality group (MPI > 26, sepsis > 20). Approximately 54% had pulmonary complication in survivor group. It was 77% in mortality group, other general complication were similarly higher. Like in age, survivor group had more local complications like wound sepsis (27%), pelvic abscess (6%) than in mortality group. Interesting aspect was faecal fistula; a dreaded complication was more in mortality group (9%) than in survivor group (7%). Analyzing the number of complications, the survivor group had less complication rate while mortality group had more. As in age group, survivor group had less number of complications per patient, while mortality group had more complication per patient.

Duration of perforation and morbidity

Duration of perforation seem to be having most corresponding relationship to complication. In survivor group the general complication was pulmonary (46%) and while it was 58% pulmonary, in mortality group. In contrast to previous group where local complication were more in survivor group here even local complication was more in mortality group wound sepsis 27% and faecal fistula 9%. On analyzing the number of complications the same phenomenon repeats. Only 32%, developed complications in survivor group, whereas 88% developed complications in mortality group.

Hospital stays as indicator of Morbidity/mortality

As in other complication patients in survivor group had less hospital stay duration than expired patients. While considering for hospital stay, patient with very high risk score, died early. and few patients who were died early immediately after post operative day 1, 2, 3 were stayed very less time also should be considered.

DISCUSSION

Peritonitis is a dangerous complication and if not diagnosed and treated in time, can terminate fatally. In our study on 100 patients in Basaveshwar Teaching and General Hospital, we found various factor like age, associated medical illness, shock at the time of admission, and extent of peritoneal contamination as important prognostic factor in the outcome of these patients. The data we obtained were tabulated and percentage calculated wherever necessary, the significance of difference in various groups were calculated using $\chi 2$ test, student-t test and other statistical methods. We have used results obtained from similar other studies to illustrate our point.

In Our Study M.C Symptom Was Abdominal Pain 100%, Followed By Distention Of Abdomen 68%, Vomiting 42 %,Constipation 23% & Fever 38% In a study by Shantanu Kumar Sahu *et al.;* [2] the commonest presenting symptom was abdominal pain (100%), followed by distension of abdomen (82%), constipation (32 %), vomiting(54%) and fever (42%) In a study by Rajender Singh Jhobta *et al.;* [3] pain was present in 98% of patients, followed by vomiting (59%), abdominal distension (44%), constipation (58%), fever (35%), and diarrhoea (7%). Air under diaphragm was noticed in 78% cases. Comparatively, study had done by Jhobta RS, *et al.;* show 67% of such cases [4]. Similar result has been found by Shahida, Malik *et al.;* where the incidence was 70% [5] showing concordance to large extent. Another study by Ashish Ahuja, Ravinder Pal air under diaphragm was noticed in 84% cases

PROGNOSTIC FACTORS

a) Age

Age seem to be the important factor in determining the outcome. Extremes of age had increased mortality rates. However, when it is divided into different group ranges from ≤20, 21-30, 31-40 …≥ 71, the Difference in age group is not statistically significant, when verified using $\chi 2$ test ($p>0.05$) The probable explanation could be, the classified age group < 20, 31-30, 41-50 which formed substantial population has similar rates. This is in agreement with studies by Delinger [7] *et al.;* who found difference in mortality in different groups as above not statistically significant. To illustrate our point, we further regrouped these into ≤50, > 50 to estimate the significance. X2 Test value was4.42, degree of freedom 1, $P \leq 0.05$, ($P=0.01$) hence the difference was statistically significant. So, age > 50 years was a significant prognostic factor. This is in agreement with studies by Wacha **[8]** *et al.;* Hence was incorporated in Mannheim peritonitis index where age > 50 years was given weightage of 5 points of severity.

AGE	SURVIVED	EXPIRED	TOTAL
<50	44	11	55
>50	25	20	45
TOTAL	69	31	100

COMPARISON OF AGE WITH MORTALITY

AGE	OUR STUDY	TRIPATHI **[9]**
<40 YEARS	16%	21%
>40 YEARS	39%	32%

Factors like decreased functional reserve, concomitant other illness such as diabetes, hypertension, and local factor such as malignancy seem to be the cause of increase mortality in elderly patients.

Sex

As in most studies males out number females by 9:1. Mortality rate was higher in females. This difference is significant, ($p<0.05$) .in our study. $\chi 2$ Test is 7.3102. and p value is 0.006. this is statistically significant result P value (<0.05)

Mortality Vs. time of presentation

In our study, duration of perforations from the time of presentation seemed to have major impact, it can be seen that mortality for patients presenting within 24 hr was 7%. which it increased to 8 % for 24-72 hrs. And upto 100% for delayed presentation more than 1 week. This is in complete agreement with the result of most

studies. There are significant no of patients with shock in the first 3 days of presentation this may be little high mortality with duration of abdominal pain since 3 days .according to TRIPATHI [9] *et al.;* mortality < 3days duration was 12.9% and between 4-6days was 57%, and > 6 days was 75%.

Duration	Our study	TRIPATHI [9]
< 3 days	21%	12.9%
4days-6days	41%	57%
6 days	71%	75%

Duration	Our study	Dandapat *et al.;* [12]
< 24 hours	24%	6%
>72 hours	51%	80%

Type of perforation and mortality

According to site of perforation and its outcome towards mortality a study by Tripathi *et al.;* [9] and Desa L.A *et al.;* and Agu K. *et al.;* [10] and Subedi SK *et al.;* [11] were compared and tabulated as below.

Site of perforation	Tripathi *et al.;* (1993) [9]	Desa L.A *et al.;* (1983)	1. Agu K, *et al.;* [10] 2. (2014)	Subedi SK *et al.;* [11] (2007)	OUR STUDY
Duodenal	15%	32%	-	10%	30%
Ileal	24.5%	275	30%	-	34%
Appendicular	10%	18%	-	-	12%
Others	50.5%	22%	-	-	28%

Effect of shock on mortality

In our study, effect of shock on day 1 was associated with significant mortality (58%) similar to other studies. In our study considering shock on day 1 it was 48%and a study by Dandpat *et al.;* [12] and Delinger [13] *et al.;* 62.5% and 51% respectively.

Parameter	Our study	Dandapat	Delinger *et al.;* [13]
Shock on day 1	48%	62.5%	51%

The finding was statistically significant (x^2 = 16.138, P = 0.0001).

Shock is systemic manifestation due to loss of fluid electrolytes, septicemia and organ failure. In agreement with most studies, we had high mortality. MPI also gave seven risk points to multi organ failure a culmination of shock and other systemic manifestations.

Study of scoring systems

a. MPI Score

MPI score was specifically designed to evaluate prognostic factors in peritonitis. It is easy and reliable (Billing) [2]. The results of our study correspond to the study by Billing *et al.;* [14], in the trend.

Scores	Our study	**Billing-2000 Pts14**	**Billing – at center four14**
<19	4%	0	1%
20-29	35%	24%	50%
>29	47%	78%	87%
≤26	11%	4.3%	5.3
>26	71%	41%	81%

The minor difference in mortality rate is due to difference in selection criteria as these studies included appendicular perforations, which has better prognosis (Billing), pancreatitis and other non peritonitis. Even then the overall mortality trend is similar. This again validates the MPI score in wide ranging causes of peritonitis and can be used for peritonitis due to various causes. As seen from graph the mortality and survivor varies exponentially with increase in the score.

The difference in mortality between 2 groups ≤ 26, > 26 was statistically very significant by x2 test < 0.001 (x^2 = 62.7). DOF: 1

b) Sepsis score of Elebute and Stoner.

Sepsis score, similar to MP1, the mortality rate increased with increase in score. An arbitrary point of 20 was taken as cut off point. Mortality rate was 4% for ≤ 20, 72% for > 20. According to ELBUTE STONER 2005 [15] SEPSIS score < 20 was 20% and > 20 was 89%.

SCORE	Our study	Elebute[(OLD)]	British journal 2005 Elbute stoner [15]
≤20	4 %	9%	20%
>20	72%	100%	89%

The advantage of sepsis score we found that it can be used both or a single indicator and for follow up. Points are given to post operative complication it like sepsis, deep seated abscess, and fistula so that patient can be monitored continuously. However one important finding was patients w conservatively had less sepsis score as score for post-operative wound sepsis, fistula were discounted, hence for these patient's the sepsis score was less compared to MPI. The mortality increase exponentially after the cutoff point (20) the difference in mortality rate is 2 groups (≤20, > 20) was statistically very significant $P < 0.001$

CONCLUSION

Our prospective study concludes that the Extremes of age (≤ 20 yrs, > 50 yrs) seem to have adverse effect on the outcome. The impact of sex outcome be conclusively proved, female patient seem to have poorer prognosis. Extent of peritoneal contamination seems to have bearing on mortality. Patients with diffuse peritonitis, faecal contamination go worse. Associated factors like diabetes, cardiovascular problems add to mortality. There is wide scope for use of Mannheim peritonitis index, sepsis score of Elebute and Stoner in present context concludes higher the scores (MPI>26, SEP>20), had more morbidity and mortality and lower and lowest (MPI<26, SEP>20) score had better outcome. Cases of peritonitis carry a high mortality which can be reduced by early diagnosis, risk stratification, appropriate treatment based on risk score. Delayed presentation has effect on both mortality and morbidity is beyond our control. Only adequate Health education, proper referral mechanism can help in reducing this. Peritonitis and its sequelae management involve lots of skill, expensive modalities of monitoring and treatment which has to be utilized judiciously based on risk stratification. This present study helps the surgeons in all the above mentioned parameters in three major ways:

a) To take better decisions on case to case basis.

b) To design strategies to prevent adverse outcomes.

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